DOCUMENT RESUME

ED 360 298 SP 034 662

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TITLE Video Cases and the Thinking of Preservice Teachers.
PUB DATE Apr 93
NOTE 8p.; Paper presented at the Annual Meeting of the American Educational Research Association (Atlanta, GA, April 12-16, 1993).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Descriptive (141)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Case Studies; *Cognitive Processes; *Cognitive Structures; Constructivism (Learning); *Educational Research; Elementary Secondary Education; Higher Education; Preservice Teacher Education; *Research Methodology; *Student Teachers; Videodisks

ABSTRACT

This conference paper describes methodological tools being used to examine teachers' cognitive lives and to describe the meaning that teachers make of teaching, learning, and students in classrooms. Methodological difficulties with the "subsequent recall" approach and the "stimulation of current thought" approach are discussed. A set of techniques is then described that addresses the problems of comparability, internal validity, fidelity, and verisimilitude. The method involves making video recordings of cases that depict teachers and students involved in activities typically found in classrooms, recorded without unusual coaching or preparation in live classrooms. To assess the process of meaning-making in teachers, all respondents then view the same case; videodiscs are used to allow for easy retrieval of any section of the case; the time between the respondents' initial meaning making as they examine the case and the time in which they describe their meaning is minimal; open-ended questions are used to reduce interviewers' influence on interview content; and key phrases elicited from the respondent during the interview are listed by the researcher on cards and then sorted into groups and labeled by the respondent, to develop an additional benchmark by which researchers can attempt to understand the respondents' meaning making. (Contains 14 references.) (JDD)

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Video Cases and the Thinking of Preservice Teachers

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Paper presented at the annual meeting of the
American Educational Research Association,
Atlanta, April, 1993

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Interests in the thinking, the cognitive lives of teachers, has undeniably grown in recent years. Early notions of teacher cognition were framed from a cognitive science perspective, seeing thinking as information processing and problem solving. As a example, twelve years ago Shavelson and Stern (1981) framed teacher's thinking during teaching as a series of decisions. Here teachers observe cues embedded in classroom routine, decide if the pupils' behavior is allowable and , if not, make a series of further decisions concerning whether and, if yes, how to react to the observed cue.

More recently, many researchers of teacher thinking have emphasized the role of understanding that is missing in this model (Peterson & Comeaux, 1987; Ropo, 1987; Shulman, 1986.) As behavior is observed, but before a decision is made concerning whether it is in tolerance, the teacher must understand -- or assign meaning -- to the behavior. Observing the snapshot of classroom behavior in Figure 1, is the teacher seeing a laudable example of synergistic classroom cooperative learning that would make the Johnsons or Slavin happy, or is this an example of pre-adolescent sexual harassment?

Figure 1 ***What meaning will the teacher make?***

Observing this classroom cue, and before deciding whether it is "within tolerance" the teacher must attribute meaning to it. She must say, Ah. This is an example of -- whatever -- and then she can proceed with a series of decisions and actions based on the meaning that is made.

In recent years a number of researchers have sought to understand this process of meaning-making in teachers (e.g., Borko, H. & Livingston, C., 1989; Clark & Lampert, 1986; Munby, 1986;

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Westerman, 1991.) What is the nature of the meaning that teachers ascribe to the complex environment in which they work? How does this meaning vary across teachers or between beginning teachers and their more experienced and capable colleagues? How do teachers develop the meaning that they make? What are the materials from which teachers construct meaning?

I should acknowledge the obvious at the outset. The members of this panel share a common perspective -- a constructivist perspective -- which assumes that meaning about teaching, learning and classrooms resides in the mind of the teacher, grown and nurtured there as the teacher's continued interaction with the teaching environment combines with his or her cognitive and affective histories. But this constructivist perspective doesn't give answers concerning the particulars of how teachers make meaning. Rather, it offers an intellectual framework which guides our pursuit of such answers.

Our topic today is how to engage productively in that pursuit. Like the other panel members, I want to share some methodological tools that we have been using at UC Santa Barbara to penetrate the rather dauntingly opaque walls that house teacher's cognitive lives and to describe the meaning that teachers make of teaching, learning and students in classrooms.

Past attempts to describe and understand such meaning appear to have utilized at least two somewhat different research approaches. The first , which might be termed "Subsequent Recall", focuses retrospectively on teacher respondents' thoughts which had originally been produced at an earlier time. Teachers are asked to write in journals or recall during interviews the content and nature of the thinking they recall having engaged in. The teacher's recall may often be stimulated, typically by replaying recordings of their actions in the classroom.

This approach has at least three methodological difficulties associated with it. The first is comparability. Comparisons across teachers about their mental lives are difficult to develop from data obtained from independent descriptions of different events which occurred in perceptively different classrooms. The second is a problem of internal validity, i.e., the problem as to whether "...researchers observe or measure exactly what they think they are observing or measuring" (Goetz & LeCompt, 1984, p. 221.) As Ericcson and Simon (1980) note, the researcher cannot be assured that the teacher's descriptions are of actual mental processes which were present in the event when it was originally enacted and videotaped as contrasted to descriptions of abstractions or reinterpretations which resulted after time and the benefit of deliberation. (Also see Munby, 1987, who terms this the problem of "reconstructed thinking.) The third problem is one of infidelity. Faced with the task of interpreting meaning of the teacher's language, the researcher is likely to impose his/her own meaning and thus not be true to the meaning originally held by the teacher (see Munby, 1982).

Faced with these difficulties, many researchers have used an alternative approach, which might be termed the "Stimulation of Current Thought", and which is intended to access contents of teachers' short term memory (Ericcson & Simon, 1980.) Here respondents are presented with common stimuli, e.g., a task typical of a teaching act such as lesson planning or paper grading, or a videotape depicting examples of teaching and learning behavior. These stimuli are intended to evoke verbal descriptions which are assumed to be representative of the teacher's thought processes. The researcher typically asks the teacher to "think aloud" as they perform the task or describe or interpret what they see in the videotape.

This methodology intends to increase control over two of the difficulties just described.. First, it attends to the comparability problem by presenting all respondents with a common set of stimuli. Thus, results can be more confidently compared across subjects. It also attends to the internal validity problem because the subject of the teachers' thoughts are present in time, not recalled from an earlier experience.

However, with this methodology the difficulty with misinterpretation remains. The researcher still must run the risk of imposing his/her own mental processes on the interpretation of the teacher's descriptions. Further, this methodology introduces a new difficulty which might be called lack of verisimilitude. That is, although the tasks or videotapes used to stimulate thought are normally typical of classrooms, they may not appear to the teacher respondents to be real because they are not of their own classrooms. The respondents are not familiar with specifics -- perhaps important specifics -- of the tasks or videotapes. For example, they don't "know" the pupils in the stimuli in the way that they "know" their own pupils. One way to approach this difficulty is to allow the teacher respondents the opportunity to develop the needed familiarity with the video recording by reviewing it a number of times. However, in practice, rewinding a videotape for repeated viewing can be both time consuming and boring, and familiarity may be achieved only towards the end of the review period, if at all.

Future work in this area needs a set of techniques which will (a) provide to teacher/respondents an object for consideration that possesses sufficient verisimilitude to enable them to construct considered and informed meaning of some aspect of teaching, learning and classrooms, (b) enable respondents to create a description of this meaning which is an internally valid representation of the meaning they actually make as teachers, (c) enable researchers to represent these descriptions with as much fidelity to the respondents' own meaning as possible, and (d) allow comparisons to be made across respondents concerning patterns and tendencies of meaning making.

A Proposed Methodology for Describing Teachers' Meaning

I would like to describe a set of techniques that we have been using at UC Santa Barbara to pursue inquiry into the meaning teachers make. These techniques are intended to address the problems of comparability, internal validity, fidelity and verisimilitude that I just described. I don't suggest that they solve these problems. Such problems are, in any absolute sense, insoluble. But I believe these techniques do reduce the risk that such problems pose and, in so doing, increase our confidence in our interpretation of the results of the disciplined inquiry to which they are applied. Further, in sharing these techniques, my hope is not so much to advocate their use but to contribute to a methodological dialogue that may lead to the development and testing of additional approaches to disciplined inquiry about the nature of the meaning educators make of teaching, learning and classrooms.

Maintaining comparability. If a researcher wanted to develop a general understanding of how teachers make meaning of instances of teaching and learning in classrooms, it would not be productive to compare one teacher's understanding of a third grade reading group at work to another teacher's understanding of sixth graders' behavior during a hands-on science investigation. The targets of these two teachers' meaning making are so different as to make comparisons unproductive.

It is clear to us that, to engage in comparisons of meaning making across respondents, the substance about which different respondents' make meaning must be as comparable as possible. To achieve sufficient comparability we have used video recorded cases of teachers and students at work. Because all respondents view the same case, it is possible to examine their meaning making on some common ground of comparison.

Video cases. As an aside here, I recognize that there are abroad in teacher education circles a variety of assumptions concerning what constitutes a case and that cases are generally thought of as taking a printed form. The video recordings that we term cases depict teachers and students involved in activities typically found in classrooms. They are not reenactments but are shot without unusual coaching or preparation in live classrooms. Yet, at the same time, they are carefully selected from hours of recordings because they serve to raise for examination particular issues considered important to teacher understanding. Thus, I would argue that they have all of the

characteristics of cases proposed by various authors in the field. That is, they are not contrived but based on real situations. They depict a series of events which unfold over time. They are particular, specific and contextualized in time and place. They are detailed, complex and substantive. They allow alternative interpretations and perspectives, invite disagreements and contrary views, and foster multiple levels of analysis.

Increasing verisimilitude. The use of a single video recorded case raises the problem of verisimilitude. Because the teacher and students depicted on the video recording are initially unfamiliar to the respondents, the video case understandably lacks a sense of being real.

To increase the verisimilitude that these video cases have for the respondents we allow them time to familiarize themselves with the cases by examining them in detail. Further, and most importantly, we attempt to make this familiarization process as easy as possible.

It is clear to all who have spent time examining videotapes that pressing rewind, play and fast-forward buttons is cumbersome and time consuming. Tape counter meters are inaccurate. To review a portion of the tape one must wait for the spool to spin forward or backward and then hit the proper buttons to stop at the desired place. One typically does not hit the point targeted for stopping the first time; buttons are hit many times -- stop/view/rewind-more/stop/view/fast-forward a bit/stop/view again-- as we overshoot or undershoot desired stop points. As much time is spent waiting and fumbling as is spent viewing. Boredom eclipses excitement and understanding.

To overcome this cumbersome quality of videotapes we use videodiscs. Any portion of a videodisc may be accessed very rapidly, on most machines within two seconds rather than the 45 to 60 seconds required when rewinding and fast-forwarding tape players. Further, to facilitate examination of the case on the videodisc, we give respondents a computerized "point-and-click" control panel which is displayed on a Macintosh computer screen. This control panel allows respondents to view the entire case in real time, or to fast forward, reverse or jump to any specific point in the case for reexamination with great accuracy.

The use of a videodisc as the source of the video case results in virtually no "down time" spent waiting for reels to spin. The effect of the control panel is to make selection and reexamination of any portion of the case very efficient. Though a recorded session of a previously unknown teacher and students can never become as familiar as one's own teaching, this new technology helps respondents more rapidly develop a familiarity with the case and, as this familiarity grows, so will grow its verisimilitude.

Internal validity. Recall that the problem of internal validity arises when respondents are asked to recall and relate the processes and products of their meaning making well after the original meaning making took place. Such recall, even when stimulated by prompts offered by the interviewer or by video or audio recordings, runs great risk of not being a valid representation of the original meaning making. In the recall process things may be forgotten, modified or embellished, often unconsciously, to the point that the likelihood is greatly reduced that that which is reported is a valid representation of the original meaning making.

The use of video cases reduces, although it does not eliminate, the problem of internal invalidity. The time between the respondents' initial meaning making as they examine the case and the time in which they describe their meaning is minimal, typically just a matter of minutes. Most importantly, during this time the respondent's cognitive processes have not been interrupted but have remained focused on the task of understanding the case.

I understand that an additional source of potential internal invalidity is the respondents' processes of raising to consciousness and verbalizing their thoughts. Is that which is spoken to the researcher a valid representation of what is in the mind of the respondent? Access to the "black

box" of mental processes is problematic at best. I propose that the use of video cases to stimulate immediate meaning making has the potential of increasing the likelihood that that which is spoken by the respondent is a more valid representation of the actual meaning made. We can never, however, assume complete internal validity.

Fidelity. The final problem is that of fidelity. Is the researcher's representation of the respondents' meaning making faithful to that intended by the respondents? We know that the researcher cannot avoid imposing his or her own understanding on communications coming from the respondents. The task is to reduce such imposition as much as possible and for as long as possible and then to recognize and name it when it occurs.

There are some research practices which have become almost standard in attempting to increase fidelity. Interviewers work to perfect techniques intended to reduce their own influence on the respondents' talk. Open-ended questions and non-evaluative acceptance moves are common practice. Further, recording media and transcription techniques are typically used to increase the faithfulness with which responses are preserved.

We have worked with an additional technique that may have promise for increasing fidelity. The purpose of this technique is to engage the respondent in the first level of analysis of his or her own expressions of meaning. In effect, we ask the respondents what meaning they make of their own meaning making.

This is how it works. After the respondent examines a video case we have an interviewer ask him or her to, "Tell me about the recording you viewed. Explain your understanding of what you saw.? A typical open-ended question. As the respondent talks, his or her response is audio-recorded. In addition, however, two researchers, listening electronically to the interview in an adjacent room and working independently, enter key phrases from the respondent's statements into computers as the respondent talks. As much as possible, these phrases, which we call "elements" of the respondents' thoughts (vis. Kelly, 1955), are captured using the respondents' own words. No effort is made to enter them as complete sentences, to formalize them with proper punctuation or to alter their expression to make them grammatically correct.

Immediately after the respondent indicates she has finished her description of the video recording, and during the time that the interviewer solicits demographic information from her, the researchers merge their two lists of elements so as to insure that all elements expressed by the respondent have been captured. The resulting single list is examined for duplicates which are discarded and for any typographical errors which are corrected. The elements are then printed separately on mailing labels which are affixed to 3 X 5 index cards.

As a result of this process, within less than five minutes of the end of the open-ended portion of the interview, the next or "confirming" stage of the interview may begin. During this stage the stack of element cards is given to the respondent who is asked to "spread these cards out on the table and then sort them into groups, each group with as many or as few cards as you would like." Following this initial sort, the respondent is asked to label the sorted piles of elements and, if it seems possible, to group the piles and label these meta-groups. Some of you may recognize some components of Kelly's (1955) repertory grid technique, and even Munby's (1982) adaptation of it, in this process. In keeping with Kelly's terminology, we refer to the labels which the respondents give their sorted piles as "constructs." This sorting process is intended to honor the respondent's perspective through examination of his or her personal constructs.

The result of this process is an organization of the respondents' "elements" as conceptualized by the respondent and labeled with the respondent's "constructs." During the sorting process the respondents are encouraged to talk as they work, describing their reasons for the sorting decisions they make. These descriptions are audio-recorded for later analysis. The point of this activity is to

develop an additional benchmark on which we can anchor our attempt to understand the respondents' meaning making.

How successful is it? We can never know for sure but we have a sense of its success in terms both of efficiency and utility. In terms of efficiency, we do know that we have become very adept at generating the original list of elements which are typed as the respondents speak. In a recent use of this technique we interviewed 28 respondents. The number of elements typed by our technicians averaged 35 per respondent and totaled 984 for all respondents. When we later compared the typed elements to the actual transcripts of the interviews we found only five typed elements that could not be located in the actual transcripts; five mistakes out of 984 tries. Further, we found no large spaces in the transcripts for which elements had not been typed.

Perhaps an even greater measure of the success of this technique is our perception of its utility. During subsequent analysis of the open-ended interviews we often find it helpful to refer to the sorted elements and the construct labels which had been generated by the respondents. We can often verify that our understanding of what the respondent had said corresponds with his or her understanding of its meaning. As an example, in one study we asked both beginning and more experienced teachers to describe their thoughts about a video case depicting a reading lesson during which 4th graders discussed a story about a boy who brings an alligator to school. Our early analysis suggested that the more experienced teachers tended to identify student and teacher actions that they expected to see but did not, in fact, see in the video case. The centrality of these missing actions to the meaning made by one respondent was clearly supported when she sorted 41 elements from her interview into one pile and gave that pile the labeled, "Something was missing here and it wasn't an alligator."

Conclusion

It is clear that there is much work to be done as we attempt to inquire into the meaning that teachers make of teaching, learning and classrooms. But such work, I submit, has great utility for studying pre-service teacher education. First, it will allow us, with increasing confidence, to describe differences in meaning making between experienced, capable teachers and their less-able or younger counterparts. In work reported elsewhere (Birmingham, Copeland, D'Emilio-Caston, DeMeulle & Natal, 1992) our group at Santa Barbara has found intriguing differences in the quantity and complexity of linkages described between teacher actions and student actions, between specifics in observed lessons and more generalized knowledge about teaching and learning in classrooms, and between pedagogical processes and academic goals. As such descriptions of differences are developed it will then be possible to look closely at how these differences arise, when and under what conditions in the education of teachers do they develop, and how might such development be supported and encouraged within formal teacher education programs.

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